

Name:

Solutions/ Answers

1. Find $\frac{dy}{dx}$ given $y = \ln x$

$$\frac{dy}{dx} = \frac{1}{x}$$

2. Find $\frac{dy}{dx}$ given $y = (\ln x)^2$

$$\frac{dy}{dx} = 2 \ln x \cdot \frac{1}{x} = \frac{2 \ln x}{x}$$

3. Find $\frac{dy}{dx}$ given $y = \ln(7x)$

$$\frac{dy}{dx} = \frac{1}{7x} \cdot 7 = \frac{1}{x}$$

4. Find $\frac{dy}{dx}$ given $y = \ln(x^2 - x)$

$$\frac{dy}{dx} = \frac{1}{x^2 - x} (2x - 1) = \frac{2x - 1}{x^2 - x}$$

5. Find $\frac{dy}{dx}$ given $y = \log x$

$$\frac{dy}{dx} = \frac{1}{x \ln 10}$$

6. Find $\frac{dy}{dx}$ given $y = \log(9x)$

$$y' = \frac{1}{9x \ln 10} \cdot 9 = \frac{1}{x \ln 10}$$

7. Find $\frac{dy}{dx}$ given $y = \log(x^3 - x^2)$

$$y' = \frac{1}{(x^3 - x^2) \ln 10} \cdot (3x^2 - 2x)$$

$$y' = \frac{3x^2 - 2x}{(x^3 - x^2) \ln 10}$$

8. Find $\frac{dy}{dx}$ given $y = \log_5 x$

$$\frac{dy}{dx} = \frac{1}{x \ln 5}$$

9. Find $\frac{dy}{dx}$ given $y = \log_5(\tan^{-1} x)$

$$\frac{dy}{dx} = \frac{1}{(\tan^{-1} x) \ln 5} \cdot \frac{1}{1+x^2}$$

$$\frac{dy}{dx} = \frac{1}{(\tan^{-1} x) \ln 5 (1+x^2)}$$

10. Find $\frac{dy}{dx}$ given $y = e^x$

$$\frac{dy}{dx} = e^x$$

11. Find $\frac{dy}{dx}$ given $y = e^{\pi x}$ $\frac{dy}{dx} = \pi e^{\pi x}$

12. Find $\frac{dy}{dx}$ given $y = e^{\tan x}$ $\frac{dy}{dx} = \sec^2 x (e^{\tan x})$

13. Find $\frac{dy}{dx}$ given $y = (e^x + \ln x)^2$ $\frac{dy}{dx} = 2(e^x + \ln x) (e^x + \frac{1}{x})$

14. Find $\frac{dy}{dx}$ given $y = e^x \cdot \sin^{-1} x$ $\frac{dy}{dx} = e^x \cdot \sin^{-1} x + e^x \frac{1}{\sqrt{1-x^2}}$

15. Find $\frac{dy}{dx}$ given $y = 2^x$ $\frac{dy}{dx} = 2^x \cdot \ln 2$

16. Find $\frac{dy}{dx}$ given $y = 2^{\ln x}$

$$\frac{dy}{dx} = 2^{\ln x} \cdot \ln 2 \cdot \frac{1}{x}$$

$$\frac{dy}{dx} = \frac{2^{\ln x} \cdot \ln 2}{x}$$

17. Find $\frac{dy}{dx}$ given $y = 2^{\cos x}$

$$\frac{dy}{dx} = 2^{\cos x} \cdot \ln 2 (-\sin x)$$

18. Find $\frac{dy}{dx}$ given $y = \sin^{-1}(\ln x)$

$$\frac{dy}{dx} = \frac{1}{\sqrt{1 - (\ln x)^2}} \cdot \frac{1}{x}$$

$$\frac{dy}{dx} = \frac{1}{x\sqrt{1 - (\ln x)^2}}$$

19. Find y' given $y = \cos^{-1}(3^x)$

$$\frac{dy}{dx} = \frac{-1}{\sqrt{1 - (3^x)^2}} \cdot 3^x \ln 3$$

$$\frac{dy}{dx} = \frac{-3^x \ln 3}{\sqrt{1 - 3^{2x}}}$$

20. Find $\frac{dy}{dt}$ given $y = \tan^{-1}(e^{4x})$

$$\frac{dy}{dx} = \frac{1}{1 + (e^{4x})^2} \cdot e^{4x} \cdot 4$$

$$\frac{dy}{dx} = \frac{4e^{4x}}{1 + e^{8x}}$$

21. Determine $\frac{dy}{dx}$ given $y = xe^{5x+1}$

$$\frac{dy}{dx} = 1 \cdot e^{5x+1} + x \cdot e^{5x+1} \cdot 5$$

$$\frac{dy}{dx} = e^{5x+1} + 5xe^{5x+1}$$

22. Determine $\frac{dy}{dx}$ given $y = 5^{\sin x}$

$$\frac{dy}{dx} = 5^{\sin x} \cdot \ln 5 \cdot \cos x$$

23. Determine $\frac{dy}{dx}$ given $y = 3^x \ln(\cos x)$

$$\frac{dy}{dx} = 3^x \ln 3 \cdot \ln(\cos x) + 3^x \frac{1}{\cos x} (-\sin x)$$

$$\frac{dy}{dx} = 3^x \ln 3 \cdot \ln(\cos x) + \frac{-3^x \sin x}{\cos x}$$

24. Determine $\frac{dy}{dx}$ given $y = \log_7(2x)$

$$\frac{dy}{dx} = \frac{1}{2x \cdot \ln 7} \cdot 2$$